

PLUTO EXPRESS SCIENCECRAFT SYSTEM DESIGN

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New developments are described in system architecture and in the incorporation of new technologies for a Pluto flyby mission. The evolution of the flight system design is covered through a number of option studies involving an extensive trade space which includes alternate power sources, and various propulsion and trajectory options. The results of this trade study have been coupled with a new development implementation approach to create a highly integrated concurrently engineered mission system called a "sciencecraft"

The current baseline sciencecraft system design results in a flight system with a dry mass of less than 100 kg, power consumption of less than 75 watts, and is functionally simple and small in order to achieve high reliability and a low total mission cost. Some of the key technologies described are integrated Multi-Chip Module (MCM) microelectronics, an advanced radioisotope power source, high efficiency micromachined Ka band telecommunication components, and beacon cruise mission operations that utilize on-board self-monitoring and self-commanding.

A baseline mission is described which uses a Jupiter gravity assist trajectory for a ten year flight time to Pluto, launching in 2003. Data from a high speed Pluto and Charon encounter will be stored on board for later transmission to Earth over several weeks. Then the sciencecraft will be targeted to encounter one or more Kuiper Disk objects as it continues its journey out into interstellar space.